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[OFFICIAL NOTICE.]

### Annual Meeting Central New York Association.

SECY'S OFFICE CENTRAL NEW YORK GAS ENGINEER'S ASSOCIATION,
SYRACUSE, N. Y., April 24, 1886.

The Seventh Annual Meeting of the Central New York Gas Engineers Association will be held at the Powers Hotel, in Rochester, on Thursday, May 20th, 1886, at 11 A.M.

A cordial invitation to attend is extended to all members of the fraternity.

H. N. BABCOCK, Secy.

## THE PHILADELPHIA GAS TRUST'S PLAN OF MAKING AMMONIACAL LIQUOR CONTRACTS.

During the past ten years the American refiners of ammoniacal liquor have been wrestling with the impression that those in charge of the disposition of the crude liquor product of the five plants under the control of the Gas Trust, of Philadelphia, Pa., were remarkably amiss in the plan followed in selling the same. Perhaps it was through neglect; possibly it may have been through ignorance, that such unique method was pursued; but, whether to one or the other of these is their action attributable, in any event the outcome of the procedure certainly is that those officials were derelict in their trust. If the ordinary or common method employed in other gas plants of the country, which are large producers of ammoniacal liquor, was instituted at Philadelphia, the receipts annually chargeable to income from such source would be at least five times greater than those which were returned by the Trust's accounts in consequence of the contract nominally awarded to Mr. Henry Bowers, on the first day of January, 1880, and which expired with the last day of 1885. Shortly before the expiration of that contract the Trust, finding itself called upon to make a new arrangement in regard to the disposal of the liquor over "future years," bestirred itself and appeared to be in a tremendous hurry to get the vexed question from its mind. Selecting two or three local papers as the surest way of attracting the notice of the large workers in such product, whose factories are in different States of the Union, and some of them 800 miles distant from the Quaker City, the following advertisement was inserted therein, on date of December 1st:

"Sealed proposals will be received until 2 P.M., Thursday, Dec. 10, 1885, for the purchase and removal of all the ammoniacal liquor produced at all the works of the Trust during the period of *five years*, commencing January 1st, 1886, and ending December 31st, 1890.

"The contractor to furnish and erect, at his or their own expense, all the apparatus and machinery (also labor and fuel) necessary for the proper scrubbing of the gas, and the collection and removal of the liquor. Also to furnish acceptable security in the sum of one-half the value of the annual production of the liquor, said value being based upon the price accepted and the probable average yearly carbonization of coal during such period.

"Payments for said liquor to be made, in cash, monthly.

"Bidders will state price per ton of coal (2,000 lbs.) carbonized," etc.

We submit that for brevity of know-nothingness those "specifications" are unique and unapproachable. A refiner is asked to bid upon a basis of complete ignorance in regard to the nature of the commodity which he is to purchase, and is given ten days wherein to travel, say, 800 miles, and make the necessary investigation as to the strength of the article likely to be re-

ceived; and with the further proviso that he is granted, in case he receives the contract, 21 days for the erection of all the apparatus and machinery necessary for the proper scrubbing of the gas made at the different works of the Trust—which, on a total average, will carbonize, roughly speaking, 825 net tons of coal per day. We had hitherto supposed it would be the duty of those in charge of a gas plant to jealously watch and see to it that the scrubbing apparatus thereof was owned and operated by themselves—far removed from the possible interference of anyone not directly responsible for and interested in the quality of the gas product sent out for consumption. Why not place the coal contractor in charge of the retort benches after you had previously awarded him the right to furnish the coal at a certain figure per ton of coal carbonized, allowing him also to furnish the scales whereon the material was to be weighed, and to pay when the ton had been "carbonized"—in his opinion.

Within this ten days the prospective bidder, in order to present anything like reasonable figures, would have his hands full. Five different works, with differing styles of carbonization in each, would have to be examined; the general plan of construction and operation to be determined; the sorts and qualities of coal usually or likely to be employed over a period of five years—with dozens of other important items to be duly inquired into and carefully balanced. Of course, he need fear but little as to the strength of the article that he was to secure—provided he had the friendship of the powers that be—for the scrubbing arrangements were to be under his control; provided, further, that he could put in a scrubbing plant, equal to the demand that would be made upon it by the daily production of 8½ millions cubic feet of gas, in just 21 days.

In fact the most cursory examination of the "specifications" inevitably leads to the conclusion that these might more justly be termed, "proposals to present Mr. Henry Bowers with the ammoniacal liquor produced at the united works of the Philadelphia Gas Trust for a term of five years; the Trust to receive therefor such sum as the said Henry Bowers may, in the goodness of his heart, see fit to pay."

The proposed action was in such apparent bad faith to the taxpayers of Philadelphia that some of these determined to invoke the aid of the courts to restrain the Trustees from completing the farce. Accordingly Mr. D. W. Chandler, acting on behalf of himself and others, appeared before the Court of Common Pleas and sued out a writ of temporary injunction restraining the Trustees from making an immediate award of contract on the terms advertised. The writ was made returnable before Judge Thayer (Common Pleas, Part IV.), and in the meantime plaintiff's attorneys, Messrs. Leaming and Johnson, prepared themselves for the final argument. Owing to the absence of records of like suits in this country, the matter submitted was entirely novel; and we believe that counsel for plaintiff succeeded in presenting a statement and argument that should have sufficed to entitle them to a permanent continuance of the injunction. They outlined the usual trade method pursued in the making of ammoniacal liquor contracts by the proprietors of all well-managed gas plants in this country and Europe, and submitted affidavits in regard thereto, made by Messrs. Austin C. Wood, M. S. Greenough, Gen. Hickenlooper, Dr. E. G. Love, G. S. Page, B. P. Clapp, Jos. R. Thomas, and others; but all to no purpose. The defendants asserted that plaintiff's proposed plan (which, simply stated, was to the effect that the Trust should be obliged to invite competition on a liquor of a certain strength) was impracticable, and Judge Thayer assented to defendant's view.

That luminous legal authority, after listening to the arguments and reviewing the papers submitted, said: "The plaintiff in his bill does not charge the Trustees with any want of good faith, or with any indirect or improper motives in exercising their discretion in regard to the manner of contracting for the sale of ammoniacal liquor, but only that the method adopted is not the proper method, and results in a considerable loss to the Trust of profits which might otherwise be made." The learned jurist after this inferential conviction of the gross ignorance—if nothing worse—of the Trustees, dismisses the injunction by relegating the entire control of the matter to those who, had they been so disposed, might have, during the past five years, received $60,000 per annum, from responsible parties, for the liquor which they gave to Bowers for $12,000 per annum; and he does it in the following words:

"Now, when we are asked to determine such questions as these upon conflicting affidavits, questions over which experts in the manufacture of gas contend and are at loggerheads, it must be obvious that at the best we are asked to substitute our own crude guesses for the deliberate judgment and conclusions of those whose special business is to decide these and other similar questions relating to the conduct of the works in question. * * *"

This doughty successor by right or acquirement to the mantle of Dogberry in effect calmly "guesses" that the Trustees should continue to present about $50,000 per annum of the people's money to Bowers or his heirs or assigns. Affidavits count for naught in the field of the Thayer vision, and possibly his short-sightedness may be traced to the fact that the Trust is a mighty political body whose future aid may be counted upon to serve in the event of Mr. Judge Thayer being seized with a desire to mount higher on the rungs of the ladder of the public service of the Quaker City—either judicially or otherwise.

This entire proceeding only tends to show how wrong in principle it is to embark or commit any manufacturing enterprise to the hands of municipal authority; and we sincerely hope that the day is not far distant when the city of Philadelphia will determine to deliver herself from the uncertain whims and "preferences" of those supposed to guard her gas supply interests. These will be easy to conserve when relegated to the care of those who will actually have invested their money therein.

## THE EQUITABLE COMPANY RETIRES FROM NEWARK, N. J.

In December, 1885, the United States branch of the Equitable Gas Light Company loudly proclaimed its intent to deliver the gas consumers of Newark, N. J., from the "bondage" in which they were held by the Newark and Citizens Gas Light Companies of that city. In truth, the "bondage," when ciphered out in reality, rested on the fact that the Newark gas consumers were being supplied with a first rate article of illuminating gas, and received such supply at a reasonable charge. However, the crusaders could not at first be persuaded that Newark did not want them; and waxed exceedingly hilarious when it was suggested that the tripartite agreement,* in existence between the municipality and the Newark and Citizens Gas Companies, might prove a rather steep hurdle in the homestretch which led to the winning post of commercial success. Not only did the Equitable managers make light of that "obstacle," but were heartily joined therein by the cachinnations of their "friends who operate in Wall street." With many guffaws these astute financiers flouted the idea that it was possible to encounter a snag in the shape of past municipal legislation; and in the jolliest sort of way merrily opened their subscription books. The Equitable Company's managers not able to set aside that agreement! Perish the thought. Trenton was easy to reach from Newark, and legislators could be so easily "convinced." In short, according to the legal talent in the service of the new enterprise, the proverbial "coach and four," which it is said may be driven through any English law, was, in the Newark instance, magnified into at least a "stage and eight." But the sequel shows that even the "coach-and-four" attempt at driving through the Newark agreement would have brought nothing else than disaster to the handlers of the ribbons.

Having arranged for incorporation under the general gas law of the State of New Jersey, and having been duly given the patronymic of the Equitable Gas Light Company, application was immediately made to the Common Council for the right to open the streets, etc. The application was referred to the Committee on Public Lighting, in whose hands it remained while the company endeavored to obtain legislation from the State that might help it in inducing the city to break the exclusive contracts existing between the city and the elder gas companies. The Equitable Company was unsuccessful in securing the coveted legislation, and this was *one* reason why the enterprise was abandoned. But the principal cause why the Equitable Company requested the Committee on Public Lighting to make an adverse report on its application—ex-alderman Barnet, Secretary of Equitable Company, and Mr. Lambert, counsel for the company, appeared before the committee, on evening of May 4th, and asked that an adverse report on the ordinance be presented at next Council meeting—was that the contract, existing between the city of Newark and the present companies, was found, after careful legal examination, to be practically exclusive. When this contract was made (two years ago) it was intended to be exclusive; and in accordance therewith large reductions in price have been made to the city and private consumers, and large sums have been expended in bettering the plant and street mains of the companies.

The validity of such contracts for a term of years has, within the twelvemonth, been determined by the highest court in the State of New Jersey, and in the Supreme Court of the United States also.

It was discovered, even if the city could have been induced to violate its good faith and attempt to break the contract, that the city would have had to immediately pay the existing companies about $150,000. Moreover, if the courts (contrary to all precedent in such cases in the State of New Jersey) did not enjoin such a violation of good faith on the part of the municipality, the latter, by the terms of the contract, would be liable for damages in a sum greater than one million of dollars. In view of which we submit that Newark's city fathers have no reason for disgruntlement at the aforesaid request of the Equitable representatives. In the meantime the Newark and Citizens Companies' shareholders may be excused for taking up the "cachinnatory" refrain at about the point in the score where it was abandoned by our Wall street wiseacres.

* For particulars of agreement, see JOURNAL, Vol. XLI., No. 4, pp. 85-6.

[Official Report.—Continued from page 257.]

## Second Annual Meeting of the Ohio Gas Light Association.

Held at the Arcade Hotel, Springfield, Ohio, Mar. 17 and 18, 1886.

First Day—Afternoon Session—March 17.

In accordance with the understanding reached (*ante*, page 257), Mr. Gemuender read his paper on the

### COLLECTION OF GAS ACCOUNTS.

Any system of collections, no matter what the line of business may be, and which is not done on the C. O. D. plan, always necessitates the following distinct operations:

1st. An account must be opened, which serves as a record of the exchange.

2d. A bill must be prepared against the debtor.

3d. This bill, according to custom, must be presented.

4th. The paying of the bill closes the account.

Were a perfect system of collections to be discovered to-morrow, I doubt if the formula on which it were based would differ in the least from the one just mentioned. When, however, the first effort is made to bring these principles into active play, unforeseen perplexities and annoyances of various kinds continually arise, multiplying in number and variety as the scope or extent of the business is increased. In fact, owing to a limited human memory, limited honesty, and other causes, each of the four items develops into quite a system by itself. Nevertheless all systems, no matter how large or complex, are but elaborations of this formula.

It seems to me that the only test of the comparative value of different modes of collecting is afforded by the time taken to prepare and effect a settlement; or, in other words, that system is the best which performs the above four operations in the shortest time, accuracy being equal.

If the gentlemen present think this conclusion valid, I would like to make the following suggestion: That a certain number of the older companies of this Association prepare synopses of their several ways of collecting, illustrating by means of blank forms if necessary, and also to give an estimate of the time required to square accounts in the average individual case. This, of course, means by the next regular meeting.

I fully understand that this will put members to considerable trouble; and I also appreciate the fact that most of the representatives are engineers and managers not especially interested in merely clerical matters. Still, it must be borne in mind that the expense of collections is quite an item in what adds to the cost of gas, and perhaps the only one which has not materially cheapened since gas was first sold. Besides, it is only at the pay counter that the company ever really comes in contact with its patrons, on which occasion the less unnecessary trouble the consumer is made to undergo the better for all concerned.

[Having finished reading, the author added that he understood the gas companies in all the large Ohio cities, such as Cincinnati, Cleveland, Columbus, Dayton, Toledo, etc., followed different systems of collection; and confessed that he would like to know the reason of the diversity. Joint debate on the Robinson-Gemuender papers was now proceeded with.]

*Discussion.*

Mr. J. M. Bate—I am afraid that the systems outlined would hardly be available at Tiffin, where we have no pay counter, but are obliged to travel from house to house, collecting our moneys whenever we can. We have a general utility man, who acts as collector, meter inspector, and reader; takes care of the services; answers all complaints; and does an occasional job of gas fitting. I think you will agree with me that he has enough to do. If we were to ask a person to come down to the gas works and pay his bill he would laugh at us. He will say that if the bill is not worth calling for it is not worth paying. As a consequence, this system we heard described would not apply to the small companies. We make out the bills every month as soon as possible after the statements are brought in. Before sending them out we go carefully over our books to see if all the meters have been read. We keep two inspection books, one of which serves in what is called the "Over the River" district, and the other does duty in the "City" section. The meter taker first brings in his "Over the River" statements, because they cover the most extensive territory. I transfer his entries into the meter register, make out the bills, and enter them in the bill register. After the inspector gets through with his meter readings he takes out a package of bills; but he does not leave them with the consumers (as was my former custom, only to go around with duplicates afterward), his instructions being to collect whatever sums he can. About 50 per cent. of the consumers will ask him either to "call again" or "at some more convenient time." Try as we may, we cannot do better than to have at least 25 per cent. of our consumers on the delinquent list each month. Some who pay promptly one month will be on the unpaid list the next month. In a small town like Tiffin it is impossible to enforce any rule requiring monthly payments. The offering of a discount has no effect. I hope that at our next meeting some member will read a paper on the simplest and easiest system of gas accounts book-keeping for the use of those superintendents of works who are obliged to take charge of every manufacturing and business detail of the company's operations.

Mr. King—I believe that our Jacksonville (Ills.) plan of keeping accounts accomplishes the object sought for with the least possible expenditure of labor. Under our old plan of running around after the consumers we, like Mr. Bate, would have an average of 25 per cent. whose bills were carried over to the next month. Now we do not carry over 1 per cent. On the last days of the month our consumers' bills are mailed them. This insures their reception on the first day of month. Consumers have until the tenth day to call at the office and obtain a discount of 50 cents per thousand. If the account is not settled by the 10th I send word that if the delinquent cannot spare time to call at our office and settle his account I will pay it out of my own pocket—*i. e.*, I will advance the money, and will expect to be repaid immediately. I have no trouble at all since I adopted that plan. If a consumer is told that you personally will pay his bill he will be pretty apt to come to time. If the account remains open on the 15th day we then send a bill by our meter inspector to the consumer, and the former is instructed to take out the meter in case the consumer still refuses to pay.

Mr. Bowers—I would like to ask Mr. King if he could grant a discount of 50 cents in case his gross charge was but $1.50 per thousand?

Mr. King—Our gross rate is $2.50.

Mr. Bowers—But that is hardly an answer to my question.

Mr. King—I would put the gross price at $2, and then make the 50 cent deduction on condition of prompt payment.

On motion a recess was ordered.

First Day.—Evening Session.

Order was called for at 7:30 p. m.

### Letters of Regret.

Secretary Butterworth announced that he was in receipt of letters regretting the inability of the writers thereof to be in attendance at the sessions of the Ohio Association. Those who forwarded their regrets included Messrs. A. C. Wood, President of the American Gas Light Association; J. P. Harbison, President-elect New England Association of Gas Engineers; C. H. Nettleton, Secretary New England Association; A. W. Littleton, Secretary Western Gas Association; and Eugene Vanderpool, ex-President American Association. On motion, the letters were received and placed on file.

The President here announced that the Association was in readiness to listen to Mr. W. W. Prichard's (Ironton) paper on the subject of—

### A YEAR'S EXPERIENCE IN A GAS WORKS.

Having heard a member remark, at one of our conventions, that the tendency of our gatherings was rather too much towards the scientific side of things to the exclusion of practical matters, I thought a paper on the small happenings of a gas man's life might be of interest to the younger members, or those like unto myself; and I am perfectly willing that those older in experience should handle the more abstruse details.

Taking charge, in 1884, of a works badly run down, I first made an inventory of that which we had, so that I might determine in what we were lacking—at least, so far as my inexperience would allow. The examination developed two principal defects; and, briefly stated, these were (1st), we did not supply the upper end of the city; and (2d), our leakage account was very large. The first, by persistent work, combined with much figuring and talk, was overcome by persuading our directors to consent to the laying of an 8 inch main, which started at our new holder (we have two) and ran to the lower part of the city. The placing of this pipe, joined to certain other conduit improvements, enabled us to supply the entire gas demands of our citizens, and also to equalize our pressure. The second item was, Where were the leaks?

Our streets are filled in with mill ashes and cinder that came from coal which carried an abundance of sulphur. This filling does great damage to our conduits through causing corrosion. A number of street lamp services, put down between 1867 and 1870, were made out of half-inch pipe, and leaked badly. We renewed 28 of these, and almost every one of the 28 were in a shockingly bad condition. Those that were not absolutely destroyed were filled with holes. I took our service book (it had been kept without an index), indexed it, and found we were in possession of several services that were not in use and which never would be used. We cut off a good many of these at the main. Quite often we found that services of considerable length had been run with ¾-inch pipe, and subsequently new mains had been laid adjacent to the premises. In one instance, by putting in six feet of ¾-inch pipe we were enabled to cut off 337 feet of smaller pipe.

The next important source of leakage was found to be caused by the meters. After considerable night wandering, when I occupied myself in mental calculation on the rate of burning of the consumers lights, I deter-

mined that many were burning too much gas, judging from the money which they paid the company. Some I was sure were burning as high as a thousand cubic feet, or over, per month, while the meters were not registering even a hundred feet. Mr. Thompson, of the American Meter Company, paid me a visit last September, and I told him that some of our meters were puzzling me. I was satisfied the consumers were burning considerable gas, but the meters failed to register it. I told him I had tested some of these meters, and the result appeared to indicate their correctness, except in one instance, where the prover reported the meter was about 3 per cent. fast. Not having a new meter to replace it with, I put it back temporarily; and still it did not register. When I had concluded the recital of my troubles, Mr. Thompson told me to take a meter that I knew was absolutly correct, and arrange it so that I could first pass the gas through the correct meter and then through the one that I wished to test. He suggested that I burn the gas in a 4-foot burner in order to determine if the doubted meter would register that quantity when only one such burner was in use; because, he said, sometimes a defective meter would fail to register a gas stream passing through one burner, when it would record the gas flow if two or more burners were in action.

I arranged the proving apparatus in the manner suggested, and among the meters reproved I tested the one noted above as three per cent. fast, but which really would not register when the consumer was using only one burner. Mr. Thompson was right; for a new meter was substituted on date of October 1st, and on October 31st it was shown that 1,300 cu. ft. of gas had been burned on the premises, while the next reading, or the one for November, showed a consumption of 1,800 cu. ft. Since October 1st, 1885, I have detected 9 meters that would not register when only one burner was in action. During 1885 we tested 260 meters, and as the results may be of interest I herewith submit them:

| Number of Meters. | Remarks. |
|---|---|
| 98 | All exact. |
| 2 | Exact, but cases were pierced. |
| 39 | Slow—not over 2 pr. ct. |
| 31 | Slow—2 pr. ct. up to 57½ pr. ct. |
| 29 | Fast—not over 2 pr. ct. |
| 39 | Fast—too much so to be of use. |
| 15 | Failed to register at all. |
| 7 | In too bad or worn out condition to test. |
| 260 | |

My experience seems to lead to the conclusion that our meter makers are afraid to condemn as useless a proper proportion of the old meters sent them for repair, simply because they fear we will complain they are too severe in their examinations. My directions to the meter makers now are to condemn the whole lot if they think best; and not to repair one unless they are satisfied that the instrument is worth repairing. To sum up the result of my search for leaks: In November, 1885, we made 14,920 cubic feet less, but sold 71,000 cubic feet more gas than that paid for in corresponding month of 1884. In December, 1885, we made 9,990 cubic feet less and sold 6,512 cubic feet more gas than in December, 1884. In January, 1886, we did still better, for we made 135,670 cubic feet less and sold 50,280 cubic feet more than was the case in January, 1885.

[NOTE.—The remark was made, after this paper was read, that Mr. McMillin (who had charge of those works prior to my appointment to them) would be reflected upon by my statement that the plant was so badly run down. I would state that Mr. McMillin's connection with the Ironton works covered a period quite remote from the beginning of mine. Further, the unprecedented flood of 1884 caused great damage to the plant, and is directly responsible for much of the disastrous leakage which has since been remedied.—W. W. P.]

*Discussion.*

Mr. McMillin—Mr. Prichard gives some interesting figures at the close of his paper. If the total output is not very large his percentage of saving must be great. I would like to ask him what his output is.

Mr. Prichard—In 1885 the output was 6,635,000 cubic feet.

Mr. McMillin—Have you made any calculation of the percentage since saved in any one month?

Mr. Prichard—In January, 1885, our leakage reached 25 per cent.; this year it is but 9.02 per cent.

The President—Complaint was made this afternoon that too little is said about small works; and as a great many of our members are connected with such plants, they will no doubt be interested listeners to the next paper, which is presented by Mr. E. W. Hamlin, of Wilmington.

That gentleman thereupon read the following, entitled—

## SOME THOUGHTS ABOUT RUNNING SMALL WORKS.

When I had written the title of this paper it occurred to me that possibly I might have better substituted the word "experimental" for "small;" and the substitution was suggested as a consequence of remembering some remarks made by one of the members of the American Gas Light Association at the last meeting of that organization. It was my good fortune to be present, as a visitor, at that most interesting meeting, and those of you who were there will, doubtless, have no difficulty in recalling to mind the discussion which followed the reading of Mr. A. C. Wood's paper on "Improved Furnaces."* After the dialogue had been carried on at some length the members were no doubt enabled, as a result of the information then acquired, to point their telescopes of investigation to the latitude and longitude of that rich field of experience, therein to discover the bright star of success—the light they had so long and so earnestly sought after; whereas to me the light of a practical application was obscured by a dark, indeed, an impenetrable cloud—a regenerative furnace in a six-inch works! Just then President Vanderpool called on one of the members (Mr. Boardman, I think) to give his experience in the use of improved furnaces in a small works. It is needless for me to inform you that the glimmering of this ray of light, as foreshadowed by the President's question, caused me to pay the closest possible attention to the remarks made by the gentleman called upon; but when the speaker mentioned a certain number of benches of sixes the cloud of disappointment settled over me blacker and denser than before; and my feeling of loneliness took on still greater sadness.

In reading over the proceedings of the different gas associations (except those of our own) I often wondered why those representing the smaller plants never had anything to say; and it is from the latter class that men similarly situated to myself must receive the information which we can practically apply to our works. That query ceased after my experience at the last meeting of the American Association. Although mechanical stokers, standard washer-scrubbers, or regenerative furnaces have given us small fry no trouble, nevertheless, and in spite of that comforting reflection, we are far from finding it to be all plain sailing when navigating our diminutive crafts. A child in its limited sphere has as much trouble as an adult, and the juvenile has fewer sources from whence to derive consolation; and so is it with the superintendent of a small plant. In my judgment his position requires more varied information and far greater tact than that needed in the large works. The latter has, comparatively, nothing else to do but to attend to the manufacturing operation, and keep the plant up and in proper shape; and to do this he has at his command all the assistance and all the money that he may require to effect his purpose—with a good round salary to act as a stimulus and recompense. On the other hand, the former is not only compelled to make the gas and keep the plant in order, but is further required to guard the gas until it is consumed, collect the accounts after it is consumed, and, as side issues, to attend to numerous other duties or tasks—which his brethren in the large works never even hear of—all of which is to be achieved at the least possible expense. As an illustration of the very crude idea entertained by our operators of large plants in the matter of what is required (or the nature of the duties to be performed) to successfully operate a limited establishment, let me narrate the following:

A superintendent of a big works recommended to my favorable notice a young man who his patron thought would suit me exactly, because—to use the patron's own language—"he (the young man) understood retort setting and pipe fitting!" Such accomplishments are quite essential; but I fear they would not "cut much of a figure," say, for instance, in case of a night's stoppage in the works, a frozen main or service, or any other of the many sudden troubles which the "small superintendent" is called on to alleviate or correct.

The works of which I propose to speak contains two benches of threes. One of the two is kept in action during the entire year, and the other is not called on until the season of heavy output arrives. The settings are on the style known as the "Covington" plan, although I might modify that with the statement that one of the furnaces (both are of the same length and width) is deeper than the other. The front wall of benches is nine inches in thickness, and thus undue radiation of heat is prevented. The deep furnace was constructed under the idea that it would give better heating results. It is 36 inches long, 12 inches wide, and 30 inches deep. I should add that there are no hot air ducts in either furnace. The deep furnace takes up about as much coke, to sustain the heats, as does the shallow one; but the former one does not require to be fired up as often as the other, and it gives more uniform results. So well pleased are we with its working that it is our intention, when the proper time arrives, to reconstruct the shallow furnace on similar lines—adding to it the hot air ducts, with possibly an air chamber in the rear. Our hydraulic main is U-shaped, and is raised 12 inches above the bench tops. We have never been troubled with pitch in the hydraulic, nor with stoppages in the stand-pipes. We carry a seal of three-quarters of an inch. We have a six-inch (four-inch connections) steam jet exhauster, which is located at a distance of 12 feet from the bench, and between the hydraulic main and the scrubber. The gas, acting under the impulse of the steam, strikes five full and one ½-inch bends before it enters the scrubber, by which means the globules of tar are broken, and the gas is freed. If

* See JOURNAL, Jan. 2, '86, pp. 3-4-5-6-7.

there is no other advantage in the plan, the placing of your exhauster in the retort house always keeps it under the eyes of the stoker.

The question has often been asked, "Does it pay to run an exhauster in a small works?" I answer in the affirmative, and for these reasons. During the winter one is obliged to keep up steam; the apparatus must be kept warm; the holder tank must be kept free from ice; and, as is the case with us, water must be pumped for use on the works. During the summer season we must keep up steam for securing our water supply. About ten bushels of coke per day will represent the fuel consumed in the operation; and even that, in some plants at any rate, could be saved by utilizing the waste heat from the benches. Twenty-five to 30 lbs. of steam, generated in an upright boiler, 8 feet high and 40 inches in diameter, will suffice to run the exhauster; and, in reality, the single operation of pumping would require the same expenditure. Back pressure is overcome; and during those periods in the winter season when we are not making gas the turning on of a small jet of steam keeps the tar in the pipes and in the scrubber soft and tractable. It helps to extract the ammonia from the gas; and if, as has been often said, it is instrumental or favors the formation of naphthaline, I may say, as the result of two years' experience—we have yet to discover that pest of gas makers. It requires no attention other than that which the stoker can give it—the oiling of the parts and keeping the exterior clean. In addition to the above, and possibly the most important feature—it increases the yield by about ten per cent.

In purification we use oxide of iron and lime, putting in one tray of the latter in each box. The lime is placed on the bottom tray, for the purpose of intercepting any tar that might enter the boxes with the gas, and so that it will not mingle with the sponge. To separate the sponge from the lime—to the end that while the latter is performing its chief function of removing the carbonic acid it may also absorb as great a quantity of sulphuretted hydrogen as possible, and thus assist the sponge in the latter's duty—we employ bagging, of the sort that is usually wrapped about bales of carpet. We prepare our sponge by mixing every 50 lbs. weight of cast iron borings with one bushel of sawdust. Iron borings cost about 50 cents per hundredweight; and we can use the mixture fully 18 months before any special deterioration is shown in its quality. When the boxes show foul we remove the sponge and spread it over a brick floor (wood would take fire), when in a short time it is completely revivified and ready to be used again. When it has become so completely charged with impurities that simple spreading will not renew it, revivification can be secured in this simple way: Spread a layer of shavings on the retort house floor, or other suitable place, place the sponge on the shavings, and apply a match. The cheapness of the mixture will, however, scarcely justify such extreme economy. Lime costs us 23 cents per bushel, and as we use but one-quarter of the quantity that was formerly required, or prior to employing the sponge, we have effected a large saving in our purification charges.

We do not paint or tar the lids of the purifiers, and to protect them against rust we keep a film of petroleum on the seals of the boxes, and at intervals rub oil over the parts above the water (or film) line. We also put petroleum oil into float tank of the exhauster, and also in the station meter, to prevent rust and undue friction. By the way, I found that by using a paint composed of iron ore dust and linseed oil on the woodwork of the purifying house, the color of the coat is not so liable to fade or change as when a lead basis paint is employed. Twice a year we pour either crude or refined oil into the holder, with the idea that such practice tends to prevent condensation there, and furthermore, that it hinders the deposit of naphthaline in mains and service pipes. During the winter we place boards on the tank coping, fitting them close to the holder, and employ a jet of steam in order to disturb the water to keep it from congealing.

The narration of an incident which happened at our works may possibly benefit some of those present. We are very particular (as, of course, all gas men are) as to the quality of the gas that we send out; and to minimize the possible ground for complaint our superintendent gives particular attention to the purifiers. On this occasion, when we had every reason to believe that our process of manufacture was working smoothly, the wife of one of our consumers said to us (in a friendly way) that we were not making good gas, as she "could smell it." The test paper was tried, but it failed to show the least trace of an impurity. Satisfied that she knew what she was talking about, we resolved on looking the matter up at greater length. We changed the boxes, slushed every pipe in the works with clean water, thinking that some foul deposit might have lodged therein; but all to no purpose as far as her olfactory nerves were concerned. We then visited the holder and applied the test paper to the water. There was the seat of the difficulty. The water had become impregnated with impurities to such an extent that it actually contaminated the stored gases; and had it not been for the sharpness and accuracy of our lady friend's olfactories it would only have been a mere question of time until the whole town would have been in open rebellion against the gas man. We siphoned out the water, as far as we dared to go, and then pumped in a full supply of pure liquid. This operation was repeated until the purity of the water in the tank was beyond question. We then put in a series of pipes which carry to the tank all the rain that falls upon the roofs of the adjacent buildings, so that now, after almost every rainstorm, water runs out of the overflow, and we have had no more complaints. Under the old plan the tank was kept filled, but never to the point of overflow; and as year after year the process of natural evaporation went on the solid matters deposited in the tank kept on increasing in accordance therewith.

In 1884 our unaccounted-for gas amounted to 10.83 per cent. of our make, and the statement for 1885 shows the figure to be 10.79 per cent. Our candle power ranges between 17.3 and 20 candles, as shown by an American Meter Company's jet photometer. We are able to sell all the coke that we can spare at the rate of 10 cents per bushel. Such tar as we dispose of is sold at $2 per barrel in our tanks; the greater portion of it is burned under the retorts. Our ammoniacal liquor brings us no return; neither does our refuse lime. We do our own meter repairing, thus saving the expense of sending them to the maker, and doing away with the necessity of carrying a quantity in stock.

I presume some of my meter-making friends will give expression to a "smile of doubt" when I say that we can make our own meter repairs; but in answer to the "smile" let me ask them why they guarantee that the prover which they sell us will be able to show whether a meter is "right" or "wrong"? The much-abused meter is but a very simple and interesting piece of mechanism after all. It is as accurate and reliable in its workings as a watch. No watch will continuously register the correct time—your best Jurgensen or Nardin will vary in the course of time. So also is it with that much-trusted agent of the gas manufacturer—the umpire which stands between him and the consumer; but, in its variation, experience tells us that, in a great majority of its recorded lapses, the consumer gets the best of its irregularity. If a consumer questions the correctness of his meter (I am pleased to say such complaints are seldom made at Wilmington), we have him name an hour at which it will be convenient for him to visit our works and see the meter tested. When he arrives we send for the offending instrument, occupying the interval in explaining to him how a meter works, and employ in the explanation a meter from which the top and sides have been removed. During the process of proving we place him directly in front of the meter and prover, so that he may watch every movement and note the variation. I do not think we ever failed to satisfy anyone who had gone through the above-mentioned experience. We do not always wait for a complaint to be made before a meter will be tested, but hold an examination in every case where we are suspicious as to the work the meter is doing. This practice will pay. It is on account of false registration, and from the fact that the public lamps are consuming more gas than your contract with the authorities calls for, that your charges for unaccounted-for gas take on such big proportions.

We make no charge for meter connections, nor for setting them; and we also see that fixtures are kept in order without expense to the consumers.

I fear I have already overstepped my time and your patience; but in closing let me say that at Wilmington, whenever the necessity for so doing presents itself, we all "take hold." The writer, although he does not "hanker" after such duties, has at divers times filled every position connected with the manufacture and distribution of gas—from that connected with the stoker's duties to the top of the scale; and while he has never lighted the public lamps, he has extinguished them—if need be, is ready and willing to perform those tasks again.

*Discussion.*

The President—Mr. Hamlin's paper is most interesting, and I hope the members will improve the opportunity thus afforded for discussion.

Mr. Hamlin—One feature I ommitted to make mention of; but I will repair the defect by stating that the plant with which I am connected was constructed by our friend, Col. Coverdale. I may further add that when I had finished reading the Colonel remarked to me that the works were really better than he gave them credit for; and I believe we have improved the works since they were handed over to us.

Mr. J. M. Bate—Did I understand Mr. Hamlin to say that the meters were brought from the residence while the consumer was waiting to see the test subsequently made? Is the meter tested at once, just at the temperature at which it stood when taken from its resting place; or is it allowed to stand until it has approached the normal temperature of the prover?

Mr. Hamlin—We do not have the meter at the works when the consumer arrives, simply because the meter has a bad reputation amongst most men. Now, if the meter was brought in beforehand the consumer might think, "This thing is all fixed up." We do not immediately put it on the prover, but wait until the meter and the prover are pretty close together in the matter of temperature, and then make the test.

A Member—I thought that would ordinarily take up about 24 hours.

Mr. Hamlin—No; it does not. I perhaps ought not to claim perfect accuracy for such tests. Perhaps the gentleman who made the last suggestion

is a meter manufacturer. I bring the meter approximately to the temperature of the prover, and use air instead of gas in making the test. The air is run several times through both meter and prover, and the air in the prover is at the temperature of the air in the room.

Mr. J. M. Bate—I would not put much reliance in that plan.

A Member—In our proving practice we connect the prover to a pipe that passes through the office wall into the open air. During cold weather we keep our office very warm; and after passing the hot air through the meter, say a half dozen times, no trouble is experienced in securing a reliable test. It appears to me that when about 30 feet of the warm air of a heated room is passed through a meter the temperature of the latter is brought to the proper point.

Mr. Somerville—It seems to me that no other class of business admits of better returns from well-directed, intelligent effort than does the gas maker's craft; in proof whereof I place in evidence the papers read by Messrs. Prichard and Hamlin. Much has been said about those engaged in running large works; but it is well for us to remember that many of the men in charge of the big plants gained their knowledge originally through an apprenticeship served in humbler structures. To-day I would not give up (if I could) the experience gathered in the days when I was secretary, collector, and stoker. That experience has been invaluable to me, and many a time has been drawn upon since. I am sure that those who are now running large works will bear me out in what I have just said. To come back to the proper province of this discussion, I would like to ask Mr. Hamlin why he put the oil in the seals of the purifiers and in the holder tank. I failed to hear his reasons for so doing, owing to a slight noise that happened at the time he was reading them.

Mr. Hamlin—At an early period of my experience, on taking the lids off the purifiers, I noticed they (the lids) were rusted out at the water line; and I tried almost every rust preventive preparation in attempting to cure the evil. As a last resort I "poured oil on the water," and it answered the purpose. We have found the practice to work satisfactorily. Another object sought, in pouring oil into the holder tank, is to check condensation, and, at the same time, to prevent the accumulation of naphthaline in the main and service pipes. It certainly would seem that the latter item has been accomplished.

Mr. Somerville—How do you put in the oil?

Mr. Hamlin—We siphon it in at the top.

Mr. Wood said that last winter he tried pouring oil in his lamp posts in order to prevent them from stopping or "freezing" up. As a result only one "frozen" lamp post was reported.

Mr. McMillin—Gas men usually regard coal oil as being the worst enemy with which they have to contend, but that seems to be a mistaken impression—in one respect, at least. I am not sure it is the application of coal oil to the water of the holder tank that prevents Brother Hamlin from being troubled with naphthaline. Oil may possibly have some such effect; but I would rather ascribe the absence of naphthaline to the fact that he uses the Covington settings. They are admirably adapted to prevent the accumulation of naphthaline; and really I do not believe it possible to get a heat high enough with them to make any naphthaline. My former experience with those settings goes to show that with them your retorts will often last through three years of work, where with the regenerative furnaces the retorts will live only 15 months; but you will get more gas per retort in the 15 months than you could get before during the 36 months. In my opinion, Mr. Hamlin's lack of trouble from naphthaline is to be attributed to the Covington setting rather than to the oil application.

Mr. McDonald—What sort of enriching material does Mr. Hamlin employ?

Mr. Hamlin—We carbonize the best quality of Youghiogheny coal; and last year we got from it, on average, 4.65 cubic feet to the pound.

Mr. McDonald—Does not that bear upon what Mr. McMillin has said?

Mr. Hamlin—No doubt, it does.

Mr. Printz—In reference to the testing of meters, I agree with Mr. Bate that considerable time must elapse before the meter attains to the temperature of the prover. I tested a lot of meters not long since, and at time of test the temperature of the room was at 67°. Previous to the test the meters had been in the room perhaps an hour. Two of them registered 2½ per cent. fast; a third, according to the record, was 3½ per cent. fast. The meters having been in duty only a very short time, I concluded to retest them the following morning. The second examination resulted in showing that two of them were exact, and the third was only ½ per cent. out of the way. The room temperature at time of second test was at 60°.

The President—The meter men ought to be able to throw light on this subject. We have not heard much from them as yet.

Mr. Phillips—As long as the test air and the meter are at equal temperatures the findings must be satisfactory. Mr. Printz's varying results, I think, came mainly from the condition of the valves. In trying a new meter the valves, owing to slight stiffness, or through being coated with oil, may work unequally; but when the instrument is allowed to run for a short time these defects disappear, and proper results are obtained.

A Member—Not long since I put out 250 new meters, and at the end of two months I collected probably a dozen of them whereon to make a test. The first examination appeared to prove that not a single one was correct. I tried them four separate times, and supposed I had given the valves sufficient opportunity to become thoroughly workable. I allowed them to remain overnight in the office, and examined them again on the following evening, and this time they all registered correctly. I believe the matter of temperature is of great importance.

Mr. McDonald—All agree in that view. The relative temperature of meter and prover is of great importance in making such tests. I have often had an experience similar to that reported by the last speaker. If the meter and prover are allowed to remain overnight in the room in which the tests are to be subsequently made, the sequel will undoubtedly show whether the meter is fit to do its work. While I am speaking I may further add that I do not believe it is possible to carry a meter from its resting place into the warm air of a heated room and expect that the temperature of the former will be equal to that of the latter after the lapse of eight or ten minutes. The metal of the meter will retain heat or cold for some time; and not only that, but the diaphragm (if it has been chilled) will require time to restore it to normal condition.

Mr. Ross—If temperature has so much to do with securing a reliable test, then how are we to know that the meter (shown to be correct in the interval of testing when normal temperature was secured) was doing its work properly at the place from which it was removed, or that it will do so when restored to its old quarters?

Mr. McDonald—Let me answer that by saying if the meter, when at work, rests in a place with a temperature nearly equal to the temperature of the gas that is passing through it, its measurement will be accurate.

Mr. Ross—May it not be that the gas does not often come into the meter under such favorable temperature conditions. Perhaps the meter is located in a warm place, and the entering gas is at a lower temperature; or, suppose the conditions were reversed. In that event have we not reason to ask, is the gas meter a reliable measurer?

Mr. McMillin—As our discussions are printed, and as many who are not gas men will read them, it is only proper for all to understand, despite this argument as to the effect exerted upon registration of meters by change of or difference in relative temperatures, that a variation of five degrees in relative temperature will only cause a variation of 1 per cent. from true measurement; and that the consumer is the one who generally reaps the benefit. While the custom of placing meters in cellars is in many respects objectionable, it is nevertheless a locality in which a pretty even temperature prevails; and bear in mind that that temperature will average about 60°, or the one at which meter tests may be best carried out. In fact the cellar location is likely to furnish a guarantee, under most circumstances, not over ¾ of one per cent. variation in registration will occur that may be attributed to relative temperatures of the gas and the meter, and that variation is more often than not in favor of the consumer.

Mr. J. M. Bate—Mr. McMillin furnishes an excellent argument against the proposed scheme of making parlor ornaments out of gas meters. As I asserted this afternoon, I prefer to go down stairs, and even to climb over boxes and barrels to get at the meters, simply on account of this matter of temperature. Some years ago, during my apprenticeship in the craft, I was engaged in running services, etc., in a Hoosier town the gas supply of which was under the charge of a superintending genius who actually had 25 or 30 meters located out in the yards of as many houses. His favorite scheme was to place them under the protecting branches or thorns of a trailing rosebush; and where he couldn't find a rosebush he would cover the meter with a wooden hood, to keep, as he said, "things from falling on it." Not having heard from him for some years, I expect he has passed over to the majority. I tried to find out from him why he adopted that plan, but his reply was, "It is none of your business."

Mr. Coverdale—Perhaps I may venture to add my experience in this question of temperature. I have always understood that the temperature had much to do with the correctness of a test. I have built a good many gas works, and always carefully selected the spot in which to place the prover; and have even substituted rubber tubing for lead pipe in making the connection between prover and meter when the latter was found to permit some change in the temperature of the vapor passing through it.

Mr. Light—Last week I had a 20-light meter removed and taken to the works to be tested. I tested it as soon as it arrived, and re-tested it after it had stood three hours in the office. A variation of 4 per cent. was shown in the figures that resulted from the respective tests.

Mr. Ross—My object in bringing out this discussion has been attained, since it has been proved that, if proper attention is paid to the temperature of the places in which we locate our meters, we can ordinarily trust them to register correctly if their working parts are not affected.

Mr. Robinson—One point in the paper not yet referred to in the discussion, and which interests me greatly, is in regard to the bad odor that was communicated to the gas by the water in the tank, the water being coated with a film of oil. I am curious to know how that noxious odor was imparted to the gas under those circumstances.

Mr. Hamlin—Mr. Robinson inferred from my remarks that at the time the odor existed the water was coated with oil. I do not know that such was the fact. The trouble occurred during the summer, at a period when the smallest extent of oil coating would prevail. Indeed, the likelihood is that the oil had evaporated. When the impure tank water was siphoned off and replaced with fresh liquid the trouble ceased. I do not think that any other person ever came under my observation whose sense of smell was even approximately acute as was that of the lady to whom I referred. She had once or twice before made complaint (in a friendly way) about the quality of our gas, and had been right about it, too; and in consequence we desired to make sure of our ground before saying to her that everything was as it should be.

Mr. J. M. Bate—I might present a parallel to Mr. Hamlin's female critic by introducing a party to your notice—a Tiffin male of the chronic kicker class. In former times he was continually detecting bad gas when no one else had a complaint to make. Finally he became so obnoxious to us that we were compelled to say to him that it was not our business in life to make gas that would constantly tickle his nose; whereupon he exploded. He could not stand it any longer, etc., etc., and we took his meter out. A year afterward he requested that the meter be put back; and his nose has not troubled us since.

Mr. McMillin—Mr. Robinson's question is an important one, since it refers to a difficulty which may occur during the summer to any one of us. Two or three guesses may be offered in solution of Mr. Hamlin's fouled gas, but they will be mere guesses. As the trouble noted occurred in the summer season, the water may have been giving off sulphuretted hydrogen that it absorbed during the winter, although I can hardly imagine a condition of affairs that would cause it to be given off for a few days only, and neither before nor afterward. It is also possible, owing to decreased quantity of gas being sent out, that bad gas might have passed through his boxes in consequence of a leaky centerseal. If his gas was not bad at the particular time when he tested at the boxes, the gas passed into the holder on the previous day, or when the complaint was first made, may have been foul. He could not determine whether that was so or not, because in the meantime he had cleaned the purifiers. The clearing of the impure water may not have been the remedy. It took some days to remove the water, but during those days he kept on constantly pumping out and filling in gas. He may have been sending out foul gas to the consumers, but in the interval he was filling the holder with pure gas. That might have been the remedy. Then, again, it might have been occasioned by running his steam-jet exhauster when no gas was being made—small plants often lie idle during the daytime in the summer season—and the water in the centerseal may have become heated so as to give off the impurities contained there. About a month ago we had an experience caused by the appearance of naphthaline in the centerseal. The superintendent turned on a jet of steam into the bottom of the centerseal, with the intention of heating up and vaporizing the naphthaline. He did do it; but he thoroughly scented the contents of two large holders filled with gas. He put enough sulphuretted hydrogenin to them to make them smell for a week.

Mr. Bowers—For some three weeks the gas sent out from the Hillsboro works has been bad. On entering out of the open air into the stores of the town you will be seized with a fit of coughing similar to that experienced when you enter a room filled with gas that has escaped from a coal stove. In my own house a gas stove used for heating one of the rooms had to be disconnected. I have tried all the tests spoken of by Mr. Hamlin with the exception of changing the tank water. That water has not been changed, I believe, for ten years. If any one here can tell what our trouble is I will thank him very much.

The President—Perhaps Mr. McMillin can point out the remedy.

Mr. McMillin—I would have to make a diagnosis of the Hillsboro works before I undertook to prescribe for them. I rather incline to the idea that Mr. Bowers' trouble may be traced to his centerseal; and that, owing to one cause or another, all of his gas does not pass through the purifying boxes. It is not an unusual occurrence for the centerseal to become clogged with dirt to such an extent that its divisions cannot be tightly closed. If that is the case it should be scraped clean.

Mr. J. Gwynn—I would like to ask Mr. Hamlin from whom he buys the coal that gives him 20-candle gas without an enricher.

Mr. Hamlin—We are using second pool Youghiogheny; but remember that last year our average product from it was only 4.50 cubic feet to the pound. We have not been taking, as some others do, 5.25 or even 5 feet out of it; but we do send out a good quality of gas. Of course, you will say our yield is low; but did we seek to raise that yield we would have to secure it at the expense of shrinkage in candle power, and hence our gas would not be satisfactory to our consumers. I do not wish to be considered as egotistical, but I do think we have had about as little trouble with our consumers as it is possible to report from any other section of the country. In fact I might say that we have had no trouble. Recently we applied to the town for a renewal of our contract, and I appeared before the Council. They appointed a committee to show why we should not sell gas at so and so; and, as a matter of course, you Ohio gentlemen who have lately gone through like experiences know that the information derived by such committees is obtained from the working of the State gas plant known as the Ohio Penitentiary Gas Works. When those in charge of that public institution furnish figures as to the cost of the gas made, they take note of no other item than cost of coal. No consideration as to interest charges on cost of plant, loss from condensation and leakage, nor any other of the many items which constitute proper charges against manufacture and distribution, enters into their account. That explains why so many of our people, and particularly the residents of our small towns, have such erroneous ideas about the first cost of gas. However, when we applied to the Council I told them that the existing contract would expire at a certain time, and, believing the town would decide to increase its lamp service, suggested that we be authorized to make the extensions before bad weather set in. They agreed with me, and appointed a committee to investigate the matter. I was invited to again appear before the Council. I did so, and submitted to them a proposition; and at that very meeting they suspended the rules and unanimously agreed to my terms. That statement shows how we at Wilmington stand with the Councilmanic representatives of our residents. We do not abuse our privileges, and endeavor to do right by those who granted us those privileges.

Mr. Bushnell—I think the Wilmington Council cannot have a very large membership. If there were many members in that body I doubt whether the contract would be agreed to so readily. I must say Mr. Hamlin's community appears to be pretty well disposed toward the gas maker; and I would favor the choice of like City Fathers in Springfield.

Mr. Hamlin—Our Council consists of good business men, and who are inclined to deal honorably with those who come before them. After the Council had appointed a committee to determine the price to be charged under the new contract in Wilmington, I anticipated that the committee would obtain their information from the public institution before spoken of, and I gathered up particulars from Ohio towns, similar in size to ours, as to prices charged, cost to the companies, etc. When the facts were collated I communicated them to the Council at the time when the committee handed in their report. The fruit of my labor was a suspension of the rules and the granting of a new contract having ten years to run.

The President—Mr. Hamlin's is a Quaker community, possessed of extreme honesty, and the components thereof evidently believe also in the honesty of others. Furthermore, the gas company is favored in having a good-looking gentleman as the director of its fortunes.

Mr. Hamlin—I cannot take that complimentary remark to myself, for I assure you that sometimes months elapse betwixt my visits to the Wilmington works. The credit is due to Mr. Wood, our superintendent.

Mr. Bowers—I was glad to hear Mr. Bushnell explain that Mr. Hamlin's success was due to the fact that he had such a small Council to deal with; but if the gentlemen are desirous of looking at a *small* Council, let them visit Hillsboro. When the time came for renewing our contract with the city the Council Committee obtained information from 20 or 30 small towns in the State as to prices charged, etc. We tried the same tactics, and laid our figures before them. Then we obtained the signatures of 75 of our best consumers to an agreement whereby they asserted their belief that we should be granted a contract on the basis of $25 per annum for each street light, and $2 a thousand to ordinary users. Indeed, they recommended that those figures be adopted. They had two "deacons" on the committee, and the deacons "knew it all," for they had been down to the Penitentiary Gas Works, at Columbus, and there they had spent four or five hours "laboring" with the officials in the direction of finding out the "prime cost" of penitentiary gas. They would not listen to the proposition submitted by us and endorsed by our consumers, and I told the committee they were free to contract with whom they pleased save the Hillsboro Gas Company. I would have given them all the "law" they wanted, but our directors finally determined to accept the Council's terms—$16 per post, we to do the repairing, and $1.50 to ordinary consumers. We have five or six consumers who pay us about 15 cents per month for the gas they use.

The President—Did you get a ten years' contract?

Mr. Bowers—No, only for two years; and that was too lengthy.

On motion, a vote of thanks was passed to Mr. Hamlin.

### Memoir on Deceased Members.

Mr. Hamlin, from Committee appointed to prepare memorials on deceased members, read the following report:

*Mr. President and Gentlemen of the Association:*—Your committee appointed to draft resolutions expressive of our feeling over the demise of our

late fellow members and friends, Messrs. Joe. M. McLean, E. D. Moore, and J. S. Thomas, do most respectfully submit the following:

Mr. E. D. Moore was the son of a gas man, his father being one of the incorporators, and the principal owner, of the Circleville (Ohio) Gas Works. He attended Kenyon College, but did not pursue his studies there to the point of graduating. He afterwards studied and practiced dentistry, which was his chosen profession. Later on, however, he visited the West, and engaged for a time in the milling business. Returning, in 1866, he took charge of the Circleville gas works as superintendent; and, in 1879, bought the works from his father, and soon became sole owner of the same, retaining control up to the time of his death, which sad event occurred after a protracted illness, in 1885. He left a wife and two children. Mr. Moore's experience as a gas man was confined to his connection with the Circleville gas works. He was an honorable and genial gentleman, and made many warm friends.

Mr. J. S. Thomas, late Superintendent of the Wilmington (O.) gas works, began life as a shoemaker in the then village of Kenton, Ohio, and subsequently worked for the Kenton gas company over a term of six years. He was next employed by the Sydney (O.) gas company, but remained in its service only a few months, going from there to Wilmington, Ohio, in 1884, as superintendent of the gas works, which position he filled creditably until the time of his death, which occurred in November, 1885. His death was caused by lung trouble produced by a bullet wound received in the late war, he being a member of Company C., 82d O. V. I. He was a clever and honorable man, though his efficiency was somewhat marred by physical weakness resulting from his wound. A wife and several children survive him. We regret to say that we were unable to procure particulars as to the life's work of Mr. McLean, further than that for some years he had been virtually the manager of the Washington C. H. (O.) Gas Company, and had the respect and confidence of those who knew him. In conclusion we further report:

*Whereas*, In view of the loss we have sustained in the decease of our friends and co laborers—Messrs. Joe. M. McLean, late President, Secretary and Treasurer of the Washington C. H. Gas Company, E. D. Moore, late proprietor of the Circleville Gas Works, and J. S. Thomas, late Superintendent of the Wilmington Gas Company, and of the heavier loss sustained by those who were nearest and dearest to them; therefore be it

*Resolved*, That it is but a just tribute to the memory of the departed to say that, in regretting their removal from our midst, we mourn for those who were in every way worthy of our respect and regard.

*Resolved*, That we sincerely condole with the families of our departed friends, and commend them for consolation to our Almighty Father; and that this heartfelt testimonial of our sympathy and sorrow be forwarded to the families of our deceased friends, and also that it be spread on the minutes of the Association.

E. W. Hamlin,
John Anderson,
H. J. Reinmund,
} Committee.

On motion of Mr. Bushnell, the report was accepted and adopted by rising vote.

### Next Place of Meeting.

Mr. McMillin, from committee appointed to select place for holding next annual meeting of the Association, reported in favor of the city of Dayton. On motion, the report was received, and the recommendation adopted.

The Association adjourned to meet on Thursday, March 18th, at 9 A.M.

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### Second Day—Morning Session—Thursday, March 18.

The Association reassembled at 9 A.M. The President announced that Mr. Fullagar would read his paper on the—

## CAUSE AND PREVENTION OF CARBON DEPOSITS IN RETORTS.

The formation of carbon in retorts commences with the distillation of coal for making gas; and no method, as yet, has been devised which will entirely prevent the deposit. When coal is destructively distilled at comparatively low temperatures no deposit of carbon, proper, takes place, and there is but slight evidence of a tendency to choking in the stand-pipes. Any trifling deposit that does take place is caused through the glueing together of the mechanical dust, by the liquid oils which trickle down through the coal, and which mass is again decomposed on coming in contact with the hot bottom of the retort. As we increase the degree of temperature at which distillation takes place the affinity between the hydrogen and carbon is lowered, and the inclination to interior deposit of carbon is more markedly manifest; the tendency to choke in stand-pipes is also increased; and, at the same time, the quantity of liquid hydrocarbon compounds becomes reduced.

As the heats mount higher the tars carry less naphtha, and become more pasty and pitchy; and the larger the volume of gas the lower is its illuminating power. As the temperature reaches its highest degrees the rich gases, and the volatile liquid carburets themselves, undergo decomposition, being converted into simple hydrogen or marsh gas, and partly deposit their carbon on the sides of the retort, while the remainder, floating away as soot in the current of crude gas to the stand-pipe, is attached to the sides of that pipe by reason of the same pitched tar slowly floating back in the retorts. The quantity of this solid soot very soon makes the tar so thick that it no longer retains its fluidity, and the pipe becomes choked up.

The greater the pressure under which distillation takes place in the retorts, and the nearer retorts are kept at a white heat, the greater the deposit of carbon. My experience has led me to conclude that high heats are the primary causes of the presence of carbon in retorts, and also account for stoppages in the stand-pipes. By decreasing the pressure on the retort to its lowest point—say, from even gauge to two-tenths pressure—you will lessen the carbon disease, but not cure it. By working at low heats you cure the stoppages in the pipes.

### *Discussion.*

Mr. J. M. Bate—I had hoped that Mr. Fullagar would tell us how we could best remove the deposits. I think he intends the paper as a foretaste of what is to come.

Mr. Fullagar—I do not see any other plan for removing it than by the simple means of air jets aided by steam. The only preventive that I know of is working under slight pressure. If we could get good clay retorts that would stand eight months ot work before needing removal of carbon we might see our way clear.

Mr. J. M. Bate—While I cannot say much that is new on the subject, I may say that in our small works we have an advantage over larger plants, in that we do not during the summer keep any unnecessary benches under fire. In summer I run a bench of fives, and keep a bench of threes in readiness for emergencies. I once ran a bench for 14 months without scurfing the retorts. Latterly I have had more trouble with carbon; but its appearance depends somewhat, I think, on the quality of the coal we were using. We are now carbonizing a different sort—a good, rich, cheap coal; but it will deposit carbon in the retorts to a greater extent than did the second pool Youghiogheny description. We run the exhauster at level gauge; some times, when the retorts are perfectly tight, we run a trifle below that. We try to keep it level. The steam-jet principle will sometimes work fairly well, while at other times it is a failure.

The President—We would like to hear from Mr. Somerville on this topic.

Mr. Somerville—I do not know that what I can say will solve the problem. As Mr. Bate said, a good deal depends on the coal. I have used a coal that gave a gas equal in every respect to the product I am now sending out, and never had carbon deposit in the retorts. I am now using second pool Youghiogheny, and carbon shows its ugly layers. I reduce it by simply decreasing the dip in hydraulic, in order to keep the liquid in the hydraulic main in a liquid condition, and thus minimize the pressure on the retorts. The presence of carbon is a serious thing, because it shows that the illuminants of the gas are being burned up in the retorts. In some experiments made by me to determine the weight of carbon that was thrown down from a ton of coal on the bottom and walls of the retort during the distillation of that weight of coal, I found that 12 pounds was deposited. The great preventive of carbon deposit is light pressure on the retorts, and, if possible, to stop the pulsation caused by the exhauster. A great advantage would be gained if we could fix a device to the inlet of the exhauster which would do away with this everlasting pulsation—a motion that causes waves of gas to strike against the hydraulic in their descent, and drives them back again into the retort. I believe those waves have much to do with carbon deposit. The air process of removal appears to me to be our main reliance.

Mr. Coverdale—Of course, that which we most desire to know is how to get rid of the deposit; but in many cases it is quite easy to get rid of it. I know of instances where works were built and started ten years ago, and in which the dips have never been touched from the first day the plants were started. Of course, if that system is followed you will have carbon, and plenty of it. Keep the hydraulic main water in a proper state of fluidity, work with as light a pressure on the retorts as is consistent with safety, carry a light dip seal, and the carbon deposit trouble will not be very burdensome. Those without an exhauster must induce their employers to put one in. The sort of coal used undoubtedly has an influence in carbon formation. At Rome, Ga., we had been carbonizing a lean Knoxville coal—we had no exhauster—that yielded only 3.65 to the pound, and the retorts appeared to be (partially at least) acting as carbon receptacles. We reduced our dip and put in an exhauster; and after five months of working under the new arrangement we can report clean retorts and a yield of 4.20 to the pound.

Mr. J. M. Bate—The gentlemen speak of giving attention to the seal. For the past 12 years we have carried not over three-quarters of an inch seal. Once in 24 hours we refill our hydraulic. The air principle of removal will not clear carbon deposit that lodges in the corners of D-shaped retorts.

Mr. Coverdale—I am satisfied also that the the sort of coal used is an im-

portant item in this consideration. At the Newport (Ky.) works a new pattern of bench pipe was used, and after the plant had been in operation about six months the stand, bridge, and dip pipes, and even hydraulic, became stopped up. They asserted the stoppage was due to the pattern of pipe used. I denied it; but replaced them with the ordinary description. The trouble was as bad as ever, and they were at their wit's end. After a while the original lot of coal was finished, and a new supply of a different sort was purchased. With the new cargo fairly at work, the deposits ceased, and they had no trouble from carbon afterward.

Mr. Bowers—I would like to ask Mr. Coverdale what is the smallest dip he would work under.

Mr. Coverdale—Three-quarters of an inch should be sufficient and safe. I would not go below that.

Mr. McMillin—I would suggest that if you had a large hydraulic main and a small dip-pipe you might get along with an eighth of an inch; but if the reverse were true—a small hydraulic main and a large dip—you would need a deep seal. The extent of seal depends, in the matter of safety, upon the character of the apparatus. Usually, I believe half an inch would be safe enough. If I run a dip it should not be greater than that. We have a carload of carbon lying in our yard, and do not work under any dip, and we run our exhauster at zero; so I submit the light dip suggestion is not a specific. For the last six or seven months we have been running heats high enough to easily turn out 9,000 feet to the mouthpiece, and yet we have not burned out carbon in that time. The only change made was in the form of the settings. I think the average heats of the retorts is not high enough to decompose hydrocarbon to any considerable extent; but it is not the average heat that causes the trouble. The hottest places in the retorts are the seats of the deposit. You ordinarily get carbon in the back end simply because that is the hottest part of your retort. If working the bridge wall setting you will probably have it alongside of the retort next to the furnace, where the flame comes up and passes over back to the bridge wall. We are now running with an open setting, and the flame does not go to the back end at all. We run our exhauster at zero, and that means zero on the retorts, not on the hydraulic main. You who run with a half or three-quarters inch seal have that much pressure with your exhauster at zero. We have no pressure; and yet when we had the retorts with the "hot places" in them we had the carbon. Now the deposit is very slight.

Mr. Dittmar—I have listened to the theories which have been advanced to account for this deposit. One believes that high heats cause it, and another claims it is caused where the retort is hottest. If the latter theory be correct, why does the mouthpiece (the coolest part of the retort) appear to be a favorite point for carbon lodgment?

Mr. J. M. Bate—In my opinion we do not get real carbon at the mouthpiece of the retort, but that it is simply a mixture of coal dust and tar, for which the stand-pipe is responsible. It is light and spongy, and is easily removed.

Mr. Somerville—A little carbon is not a dangerous thing; in fact a little carbon is a good thing. A slight skin of carbon on the retorts tends to make them very tight. When I first spoke I said the sort of coal had something to do with the matter of carbon deposit, but I am inclined to take that back, since the coal that gave the bad results at Rome, Ga., gave me good results. Perhaps Mr. Coverdale may have had a very poor lot of it sent him. The great idea is to get the gas away from the retort as quickly as possible after it is made. I have always made it a point to keep the water in the hydraulic main liquid and clean. In a works that I once visited they were getting about two feet to the pound, and no end of carbon to the ton. I examined the hydraulic main and found it had never been touched. The dips ended in a pitchy basin which hugged them closely, and the seal carried was about 7 inches. The apparatus was cleaned out thoroughly, and the dips adjusted to a light seal, with the result that the yield per pound was more than doubled, and the trouble from carbon deposit was almost obliterated. If we do not work intelligently we cannot expect to work successfully.

(To be Continued.)

## Fuel and Smoke.

The London *Journal* notes that on Saturday, April 10th, Prof. Oliver Lodge delivered, before the royal Institution of Great Britain, the first of two lectures on the subject of "Fuel and Smoke, considered with reference to the Scientific Principles underlying the Use of the One, and the Avoidance of the Other."

The lecturer began by remarking that it was not necessary to make any apology for bringing before such an audience a subject which had more connection with the improvement of daily life than with abstract science. As a rule, it was best for a demagogue of pure science to adhere to his chosen pursuits, and to speak of that which he knew best; but two things had led him to abandon this course—the first being a strong desire which had long possessed him to do something towards helping forward the movement against the evils under which dwellers in cities patiently suffered; and, secondly, the remembrance of the spirit and object with which the Royal Institution was founded. The pollution of the atmosphere existing in Count Romford's day, though it properly excited his disgust, must indeed have been trivial to what it was at the present time. Had the Count been listened to much of the present evils would not now exist. But he was not listened to; and the result was that the vast majority of the dwellers in cities, who were unable to leave their vocations and retire to the country in the summer months, never breathed the pure breath of heaven or saw the sun—they eked out their existence in slums and courts into which the sun never penetrated, and no fresh air found entrance. He was not able to point out a complete remedy for this, though he might be able to indicate the main lines upon which a gradual and perhaps speedy improvement was possible.

In the first place, he wished to direct attention to what was usually called the combustion of coal. There were some bodies which when heated melted before they began to do anything else—such as ice, butter, lead, and iron. Certain other bodies—such as hydrogen, phosphorus and gunpowder—took fire and burnt; and other bodies—such as marbles, feathers, wood and coal—chemically decomposed when heated, before they could accomplish anything further. Bodies in this last category could not properly be said to burn their products of decomposition, or they might not be combustible; and, if combustible, they might or might not burn. The products of the decomposition of marble were two—one solid and one gaseous—quicklime and carbonic acid, which were both absolutely incombustible. The products of the decomposition of coal, though far more complex, were separable into two classes—the solid and the gaseous, and both were thoroughly combustible under favorable conditions.

It was easy to distil coal without allowing its solid or gaseous constituents to burn; it was done every day at gas works, and was likewise done every day (though perhaps in ignorance) in ordinary coal fires. There were several stages in the structure of a coal fire. You first emptied on the fire a shovelful of coals, which had to be heated and decomposed—separated into its gaseous and solid constituents; the gaseous ones being distilled off. During this operation the latter might catch fire and burn; but more commonly they did not do so, as they were scarcely hot enough. It was not a fire but really a still. It warmed no one; and unless the fire was pretty vigorous it was liable to be put out by the evaporation of the gas. Sometimes it could be started into life by applying a match; and the poker had to be brought into use to increase the supply of air. This point was of great importance, and one which was very often overlooked. The conditions of complete combustion were sufficient air and sufficient temperature. These two conditions served as a key to the advantages and disadvantages of different kinds of stoves. The fact that combustion was difficult or impossible if the supply of air was not sufficient might be illustrated by holding a piece of wood at the top of the chimney of an ordinary paraffin lamp. Another way of illustrating this fact was by trying to burn one gas flame above another, when it would be seen that the flame was dim and smoky, showing that the combustion was by no means perfect. A very good way of putting a fire out was by burning a newspaper under it; whereas, if the newspaper were placed at the top, the gas given off from the coal would become ignited. It was well known that when coal mines caught fire one simple device for putting out the fire was to choke up all the shafts except two, and to supply the mine with nothing but burnt air.

The products of gas works were not merely gas and quick-lime; but they included ammoniacal salts in large quantities, besides sulphur and tar, in which were latent a number of useful aniline tars—creosote, naphthaline, and asphalt. Of the coal tar products many were extremely valuable, though not so much so as they were some time back. Quite recently a new substance had been discovered by Dr. Falberg which was said to be 230 times as sweet as sugar. The stuff distilled off from incipient coal fires contained all these substances; and the smoke from factories was even more appalling than the smoke from houses. What became of the smoke? The larger particles settled as smuts; but the majority, or small blacks which crowded the air, went to dirty one's clothes or furniture. The tawny products of coal smoke prevented the growth of vegetation in London. The sulphuric acid produced from the burnt sulphur was 6 tons per 100 tons of coal; so that it was not very difficult to arrive at the amount of impurities given off annually in London from coal fires.

The second stage of the coal fire was that of flaming, when the gas coming off was more combustible; and, so far as it was completely burnt it constituted a gas fire. Many people abused the gas fire because it gave off a dry heat and a smell; but if the gas fire was properly constructed this ought not to be the case. The most common arrangement of gas-fire was to use clinkers of fire-clay, held together by asbestos, though this was probably not the best description of gas fire. The best arrangement was to have the clinkers piled up vertically, and the burners playing on the face of them, by which means the greatest possible amount of radiant heat was obtained in the room. This plan had been extended by Mr. Fletcher, of Warrington, into having

the asbestos sticking out from the fire-clay, by which means the gas very easily held the asbestos. He did not say that these fires were perfect, but they were at present the best in existence. Directly the fire was lighted a good supply of heat was obtained from it; and if the fire was properly arranged it might be burnt without there being any smell in the room. This was a very good test as to whether or not the fire was properly constructed. He did not understand what was meant by the complaint that dry heat was given off by a gas-fire, for a gas fire could no more dry the air than a coal fire. If you heated a room by a gas stove the air was heated, and it ultimately heated the things in the room; whereas with an open fire the things in the room become heated, and they ultimately heated the air. There was this difference—that if the air was hotter than the walls of the room it tended to deposit its dust upon the walls. Any surface cooler than air tended to attract the dust out of the air; whereas any surface hotter than air tended to keep the dust off. [The lecturer illustrated this fact by means of two vessels—one filled with hot and the other with cold water—which he placed under a glass bell filled with smoke; the vessel containing the cold water after a short time being covered with dust, while the hot vessel was almost clean.]

The best way of heating a house or room was by a combination of radiation and hot air, as might be obtained by Captain Galton's ventilating grate, or the Wharncliffe patent warm-air and ventilating grate. A coal fire in the flaming stage was a gas fire; but a very bad one, as was generally the case where gas was made upon the premises. The gas being made badly was unpurified; and, being mixed with carbonic acid, it burnt in a flickering way. Home manufactured gas was not everything that could be wished for. It was much better to have it made at some central station, and delivered in a purified state by means of pipes, so that it could be burned under proper control. It was much better to have a gas fire which could be raised or lowered by means of a tap than it was to have an amateur gas fire on the hearth.

The third stage of a coal fire was the red-hot stage, when the carbon was slowly burning. This was the only perfect stage of the coal fire; but what was it that was really burning? It was not coal, but coke, as the volatile products had been consumed. There was a great deal to be said in favor of anthracite, which was being burnt very largely in Canada, though it was difficult to light and to keep burning. It was also said that special grates were necessary in which to burn this coal, and no doubt this was true. No solid fuel could compare with gaseous fuel, for in the case of a coal fire, besides the trouble of lighting it, the ashes had to be removed, all of which was unnecessary with the gas fire. The red-hot stage of a coal fire was its best and only perfect stage. But then it lasted for only a short time, and the manufacture of gas had again to be gone through when fresh coal was put on.

After describing the various methods used in different parts of the kingdom for stoking a fire, the lecturer said that the proper place for fresh coal was at the bottom and not at the top of the fire; the next best place was the middle; and after that the front of the fire. If you wanted coal to burn, and not to distil up the chimney, you should never put too much on at once, and then not on the top. It was troublesome, no doubt, to place coal at the bottom of the fire; but it was a means of making the air purer.

One objection to gas fires was that of expense. No doubt the question of expense was a serious one; but cooking by gas was cheaper than cooking by coal. For really cheap warmth an open fire was unsuitable—it was a luxury. No doubt gas for illuminating purposes was too expensive to cook by; and hundreds of inventors were now turning their attention to this subject. Coal gas could be supplied cheaper than it was now, as the gas might be said to be, to a certain extent, a bye-product. It was the pipes which cost so much; but if the gas were sold cheaper the pipes would be used during the whole of the 24 hours, and consequently the cost would not be so great. Sir William Siemens suggested that gas might be divided into two classes—one for heating and one for lighting; and no doubt before very long this would be done. He hoped before the next century commenced to see gas displaced for domestic lighting, but employed far more extensively for heating purposes. Much had been done to abate the smoke nuisance. He hoped, however, they would never be content with the abatement, but go in for the total abolition of smoke, which could only be done by doing away with coal fires.

## Dr. Auer's Incandescent Gas Burner.

*La Revue Industrielle* says that for some time past much attention has been given to an illuminating method invented by Dr. Auer von Velsbach. The prime feature of the new plan rests on maintaining at incandescence, in the flame of a Bunsen burner, a sort of circular textile fabric previously treated with a chemical solution or preparation. Last November, in filing his application for a patent, the Doctor submitted the following claims:

1st.—The application in gas burners of an incandescent substance formed by a combination of the oxide of lanthane,[1] and zircon;[2] or the oxide of yttrium[3] and zircon.

2d.—The replacing of the oxides of yttrium by a quantity of erbium,[4] exempt from the other elements belonging to this rare group of oxides.

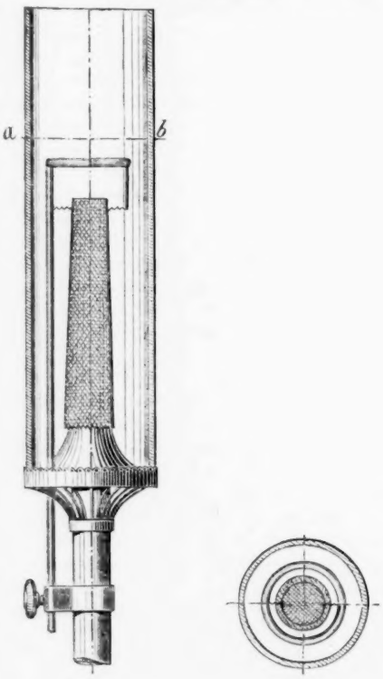
3d.—The replacing of the oxides of lanthane by oxides whose elements belong to the group of rare earths found in cerite.

4th.—The replacing, completely or partially, of the earth of zircon by magnesia.

5th.—The formation of a cotton or woolen textile, shaped like a corrugated flue, and impregnated with a solution, nitrate or acetate, of one of the combinations above mentioned; which textile, directly carbonized, allows the residual earth to remain in the form of a tissue which, without further manipulation, gives a perfect adjustment of the burner and incandescent material.

6th.—The use of a shape other than tubular; care being taken to strengthen the most exposed parts by the aid of a solution of nitrate of magnesia and alumina.

Referring to the accompanying cuts, it is evident that the burner is an ordinary Bunsen, whose top is surmounted by a hood of thin cotton or woolen cloth, prepared in the manner outlined in the quotations from the




Plan. Section.

specification. This hood, 6 or 7 centimeters (2.26 to 2.76 inches) in height, and slightly truncated in form, is supported by means of a platinum wire, which traverses the upper part, fastened to two iron rods suspended from above by means of a ring. The longer of these rods is kept in place by a screw pressing on a metallic band fastened at the burner shank. When the gas is turned on and lighted a rather high heat is developed in the interior of the hood, which soon becomes a focus of white light remarkable for steadiness and brilliancy.

As yet we have no precise information as to illuminating power developed by it from the consumption of a stated quantity of gas. Not vouching, therefore, for the accuracy of the following, we may say those interested assert that a saving of 50 per cent., or even more in consumption quantities, is secured over that taken up by an ordinary batwing burner showing equal lighting results.

A company has been organized for the purpose of developing Dr. Auer's scheme, and it is said that M. Cadiot is in readiness to exhibit some of the burners in actual working duty in the city of Paris. Therefore, it is likely their real worth as lighting agents may soon be adjudged. Those in interest assert that the incandescent envelope can be sold at a charge equal to 3¼ centimes (6.78 cents), and that it can be kept in duty for 1,000 hours before its usefulness is impaired.

Tessie du Motay and Caron made experiments on zircon with a view of

1. Lanthane, a carbonate of cerium occurring in thin, four-sided plates, or minute tablets with beveled edges; also in fine granular or earthy state.
2. Zircon is the metallic constituent of the earth, *zirconia*, which is found in association with silica in the minerals *zircon* and *hyacinth*.
3. Yttrium is a very rare metal, whose oxide is the earth *yttria*, found in the Scandinavian mineral, Gadolinite.
4. Erbium is a rare metal. Its compounds are found in Gadolinite obtained from Ytterby in Sweden. It bears a strong resemblance to aluminum.

utilizing it as an incandescent aid to oxyhydrogen lighting; but those investigators employed the substance in solid form, whereas Dr. Auer appears to be working on lines similar to those proposed in later years by M. M. Clamond, Popp, Fahnehjelm.

[Dr. Auer's burner has been worked up in the manner followed out by that eminent disciple of American gas science, "Prof." T. S. C. Lowe when the latter proclaimed that he had solved the problem of incandescence gas lighting by the discovery of a material, composed of "certain proportions of irridium, platinum, osmium and palladium," which was cheap and practically indestructible when exposed to the action of his low-power heating gas. Dr. Auer's failure is about as complete as that experienced by the Norristown *ci-devant* balloonist, for Mr. Thos. Fletcher, of Warrington, England, in a letter published in the April 20th issue of the London *Journal*, says: "This burner (Dr. Auer's) is not altogether a novelty in England; having achieved a failure here some three years ago."—Ed.]

## Notes from the West.

By Retort.

Evansville, Ind., gas people have added to their holdings by placing a plant in the city of Paducah, Ky., which is now in operation. The old Paducah Company was bought out, and a new franchise obtained. Mr. Geo. McCoy, of Evansville, has charge of affairs, and Brother Baxter, of the same company, has had charge of erection. He has built a plant of unusually large capacity, and the works are entering upon a good business.

Colorado, Texas, apparently intends to keep up with Waco, as we find they had a gas explosion at the former place on April 26th; but, fortunately for them, the Opera House people (who were saving money (?) by running their own "machine") gave the performance. It seems they had a gas machine in the "back yard," and someone dumped hot ashes out of a second story window on top of the innocent generator, whereupon the latter "humped itself" with a loud report, and tore things up generally. No one injured; damage $2,000. When that sum is added to the Opera House gas account the saving(?) in expense will be apparent! The Colorado gas company, however, improved on the Waco plan.

Brother Lansden, of St. Louis, has on hand a small sample of the labor strike—his coal heavers having "gone out," a few days ago, after demanding ten hours' pay for eight hours' work. As the St. Louis Company paid as large wages as any other corporation in the city, they have given the men two days in which to return to work before filling their places. Just now, a gas company in this part of the country without a "little strike" on hand is behind the times; but, however, if they only embrace this class of labor they won't count for much.

When the "superb" Legislature of Ohio brought forth its famous bill with which it was to imprison in the "county jail" gas presidents, directors, etc., for the mistakes of the office, in what they termed the "presentation of fraudulent gas bills," it seemed as though that was enough for one session; but another bill has shown its head, and this time it desires to enter the Hickenlooper district in order to divide the usufruct. It is our impression the General "smiled a knowing smile" when he first learned of the "little bill"—which was long before the average solon at Columbus heard of it. The following, from the editorial columns of a Cincinnati daily, rather inclined to be anti-gas, shows the animus of the scheme:

"We are aware that the people of Cincinnati should have gas at a lower figure than they are paying. But that is not the object of the strike that is being made at the gas company through the Legislature. That is a plain case of a cry against monopoly for blackmailing purposes. If more money can be got out of the gas company than it would cost to bribe and bellow the bill into a law, there will be a clear profit. That is the whole story.

"The tender-hearted people are expected to listen to the yelling against the gas company as a monopoly. The company has money, and the raiders want a share of it.

"The way to fight the gas company of Cincinnati—if any honest man wants to do that—is not to get up a competing company, for that will be a false pretense—a fraud to be sold out, a project for a consolidation, the people paying the charges—the old story of private blackmail under the guise of public benevolence. The way to do it is to fix the price at the end of the present contract at a rate that is 'reasonable.' [Price per thousand is fixed at the end of every ten years, and now has about two years to run before adjustment.] There is the same yawp made just now that there was when there were shrieks of distress for a competing stock-yards—the meaning being that the old stock-yards were to be struck for a new Gang—the same outcry made for street railroad competition that there was when the three-hundred-thousand-dollar Spring Grove avenue job was engineered. The people of Cincinnati ought to understand the symptoms of this sort of swindle by this time. Even the members of the Legislature ought to know at sight one of these schemes of holding up a monopoly and milking it for money."

## Fire Risks of Nitric Acid.

*Engineering* says that M. Lechartier has communicated to the French Academy of Sciences some valuable observations on the fire risks attending the storage and transport of nitric acid. The manufacture of dynamite and gun-cotton requires nitric acid, which, by its concentration, is akin to monohydrated nitric acid. The acid which marks 48° to 49° of Beaumé areometer at 15° C. has a density of from 1.50 to 1.51. It contains from 91 to 93 per cent. of monohydrated nitric acid, and like the latter it renders iron passive and transforms benzine into nitro-benzine without addition of sulphuric acid. It presents in transport and manipulation the same risks as pure monohydrated nitric acid. M. Lechartier gives cases of combustion during the removal of some carboys of the acid wrapped in straw and in wicker cases. At the end of May, 1883, an open wagon on the line from Paris to Brest containing these carboys took fire on going into the railway station of Caulnes-Dinan. At Brest, during the following month, another wagon took fire while in the sheds removed from other goods. This wagon was the last of a consignment from Lyons, which had taken fire *en route*. Examination showed that these fires were due to the breaking of a carboy; and the explanation is that the acid, acting on the straw, heated it to combustion, the action being accelerated by the sun's rays. M. Lechartier has made a number of experiments to prove that this explanation is substantially correct, and shows how important it is that all organic matter such as straw should be removed from the vicinity of these concentrated acids during their transport and storage.

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Personal.—The many friends of Mr. F. M. Roots will be rejoiced to know that the patience and heroism with which he has battled with the tortures of the lingering and baleful disease that has for so many years beset him is likely to be rewarded by complete restoration to health and strength. The moving spirit of the Connersville (Ind.) exhauster establishment could illy be spared from the scene of his labors, or from the presence of his friends; but so great has been the improvement made in his physical condition that we may safely hail the recuperation as certain evidence of a renewed lease upon all that humanity most desires—life, with health and strength.

Mr. T. F. Rowland's Suggestion to the "Delegates."—Among those establishments more or less dependent upon the vagaries of the wage workers one would naturally class that of the Continental Iron Works as furthest removed from any likelihood of ever becoming at variance with its employees. Some five years ago certain classes of the skilled workmen—in fact, we think a like privilege was extended to all whose names figured on the payrolls—were given a half holiday on each Saturday, while they were paid for 60 hours' of work; and paid the highest market rates, too. Still, in these days of turmoil, in regard to the relations existing between employer and employed, it is hard to say whose business will be selected by the "executive boards" of this, that or the other society as the next to be "tied up" and the workmen told to "go out." But, apart from all conjecture over such uncertain antics, a visit was made to the Greenpoint shops some days ago by a delegation from the Empire Protective Association, or other likely fantastically named labor organization, who, upon their entrance, inquired for Mr. Rowland or his authorized representative. Mr. Rowland, happening along at this particular juncture, the visitors informed him they were walking delegates from such and such a body, and were desirous of conferring with him on certain matters connected with his employees, etc. Mr. R. heard them through, and then exclaimed, with most orthodox urbanity, "Walking delegates, eh? Well, gentlemen; do not let me interfere with your duties; please walk out." They "walked out and on;" but it is quite likely they will be heard from again. Unless history fails to repeat itself, on this occasion only, the workmen of this country will soon learn to regret the blind fatuity which has spurred them on to listen and assent to the counsels of scoundrels who care not how great suffering is entailed upon their deluded followers, provided the inciters reap a prolific crop of pelf or notoriety, or both. Brains and capital will never consent to acknowledge equality with ignorance coupled to brawn; although both the former are ever willing to give to the latter its just due. And let the workman and laborer remember that the utter or partial assassination of the one could but mean suicide or impotency to the other.

Legislation Permitting Existing Gas Companies to Embark in the Electric Lighting Business.—We are in receipt of the following letter, from Mr. W. Eliot Fette, President of the Marblehead (Mass.) and Managing Director of the Dedham and Hyde Park (Mass.) Gas Light Companies. It bears date of May 5th, and was written from No. 11 Walnut street, Boston, Mass. It explains itself, and the application of the points contained therein might be made with wisdom in many States in this country. We do not incline favorably to the idea of operating electric light plants in con-

junction with gas works, because we are far from convinced that gas men have anything to fear from the competition of electric light suppliers. However, there is no gainsaying the policy and wisdom of working in concert on any question which involves an app'ication to legislative bodies; and if gas company charters are to be so amended as to embrace or permit of the delivery or supply of electric light as a future branch of their business, it would be a sound move did they seek to have general laws passed rather than that each individual company should "go it alone." Mr. Fette's communication is annexed:

"To the Editor American Gas Light Journal:—After two or three months spent last winter in trying unsuccessfully to persuade the directors of different gas light companies of Massachusetts to join me in an endeavor to secure the passage of a general law permitting any gas light company to supply electric light, I determined to 'go it alone,' and I presented to the Legislature two bills—one for the Dedham and Hyde Park, and one for the Marblehead company—authorizing said companies to change their names to 'gas and electric light company,' and to supply electric light to those who wish it. I appeared, personally, before the Committee on Manufactures, and, after three hearings, the committee reported favorably upon the bills. The original bills were somewhat modified in the House, and were then passed by both branches of the Legislature. The modifications made in the bills were not important, but the bills, as passed, will be made a precedent in the case of similar powers being sought by other gas light companies—already the managers of several companies have asked me if it was too late for them to obtain similar powers to this—and the changes might have been avoided, and the original and more simple bills passed, had there been united action on the part of the companies, and had the desirability of the legislation asked for by me been recognized last winter, as it is now. Both the Hyde Park and Marblehead Companies have made a reduction of 25 cents per thousand cubic feet in price of their gas."

Mr. Fette's management of these companies deserves the highest commendation.

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Improving the Philadelphia Gas Trust Plant.—The Gas Trust folks are about to engage in an extensive system of betterments on the mammoth establishment under their charge; and it is expected—in fact, it is certain—that when the improvements are completed the Quaker City works will be in a position to supply any demand likely to be made upon their carbonizing resources. Among the contracts already awarded we may note that, on May 3d, Messrs. J. R. Floyd and Geo. F. Kreischer, (both of this city) were authorized to erect and equip 44 benches of nines—one-half to be on the Klonne plan, and one-half on the Stanley-Stedman system. Mr. Floyd furnishes the castings, Mr. Kreischer to supply all retorts and fireclay material. Mr. Floyd will also put in the iron floors. The contracts call for the completion of the work by first days of November and December, and the contractor's names are sufficient guarantee that everything will be in working order on the specified dates, even though the task is of huge dimension. Now that the Trust has decided upon inaugurating a progressive and intelligent policy, we expect shortly to be called upon to chronicle further items of like purport to the above.

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The Eight Hour System.—It is reported that the Peoples Gas Company, of Chicago, Ills., has modified the firemen's duties in that they will in future work in shifts of eight hours instead of twelve, as formerly. The rate of pay, however, was cut down from $2.75, for a 12-hour shift, to $2.50 for the eight-hour schedule. It is said the new allotment will require the hiring of sixty additional hands.

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What the Lockport (Pa.) Retort Works are Doing.—Mr. James Gardner, Jr., who succeeded his father (Mr. Wm. Gardner) in the proprietorship of the Lockport Fireclay Works, paid us a visit the other day, while *en route* for Boston, and reports that he is enjoying a full share of favor from the gas makers. Among the contracts now on hand may be mentioned six benches of sixes and five benches of fives for the Toledo (Ohio) works; also ten benches of sixes for the Richmond (Va.) plant. All of that bench-work is on the bridge wall plan.

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Col. McCarty and His fer-Hydric Gas Process.—About the end of last April Col. McCarty (we had something to say in regard to his operations at McKeesport, Pa., in our issue for Dec. 16, 1885) informed the Associated Press agent at Pittsburgh, Pa., that Prof. Jas. Bartlett, chemist at Yale College, and Prof. E. Dwight Kendall, of the New York School of Technology, had concluded a thorough test and examination of his (the Col.'s) fer-hydric system of gas manufacture in "behalf of the gas companies of New York, Jersey City and Hoboken." We do not see why the Col. required any other name than Hoboken; for, with Hoboken satisfied, the balance of the country must needs be convinced. At any rate, the Profs. were satisfied—so said McCarty—that the long-looked-for revolution in the process of evolving an artificial illuminating gas had been solved by the McKeesport wizard. It seems, nevertheless, that the "brilliant commander" had not deployed his advertising forces with due discrimination, because Prof. Kendall, some two or three days after the Press despatches made their appearance in the New York dailies, repudiated the verdict which had been put out in his name, by asserting that his analyses figures were far from completed, and would not be ready for some time. The most ridiculous portion of the McCarty advertising manifesto was contained in the assertion that the fer-hydric gas could be supplied at a charge of three cents per thousand cubic feet, although a saving omission may have been contained in the fact that the Col. said nothing about the cost of production. Of course, fer-hydric, "oxyhydric," or other gases could be supplied at a charge of three cents per thousand; but it would require rather substantial financial backing to keep the suppliers thereof in good commercial condition.

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Low Prices for Sulphate of Ammonia in England.—The latest market reports (English) of quotations for sulphate of ammonia show marked weakness. The fall from highest point recorded in early March (when prices were stiff) shows a decline of almost £4 per ton, the product being quoted at £10 10s. f. o. b., at Liverpool, on April 30th. Messrs. Bradbury & Hirsch predicted (on April 30th) that lowest point was about reached for this season's transactions. The spring has been unusually backward in Europe this year, or just the opposite of that experienced in this country. Last year the contrary was the case.

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What do They Want of Them?—The Port Jervis (N. Y.) *Union* is our authority for the statement that a proposition is being urged which authorizes the village trustees to purchase the plant of the Goshen Gas Company, and to pay for the same by emitting an issue of bonds. If the Goshen Gas Company is in a bad way let it advertise its works as awaiting a purchaser, in our columns, and we will assure the owners thereof that if the plant and franchise are worth anything they will speedily secure a customer.

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Is this True, Mr. Taber?—Nantucket (Mass.) advices assert that New Bedford (Mass.) will string 50 electric lighting beads along her streets. As this is the time when we may expect the glow worm to make its appearance, one would naturally suppose the insect would try its "mightiest" to conquer the former abiding place and stamping grounds of the oleaginous remains of the cachalot. We did believe that the New Bedford gas folks had succeeded to the cachalot's estate in so far as the latter was to be administered upon in the city of New Bedford; and we believe so still, despite the electric lighting assertions which have emanated from the vicinity of its old-time whaling port rival—Nantucket.

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Mr. Rowland will Build the Holder.—Mr. T. F. Rowland, Proprietor of the Continenta' Iron Works, Greenpoint, L. I., is now engaged in the work of putting up a holder (300,000 cu. ft. capacity) at the Harlem station of the Consolidated Gas Light Company, this city.

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More Street Lamps for St. Paul, Minn.—The St. Paul (Minn.) Council has recommended that a considerable addition be made to the number of gas lamps now illuminating the streets of that city of surprising and substantial growth.

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Killed by the Electric Current.—It would seem as though the electric light suppliers are anxous to keep pace with the purveyors of water gas in the matter of taking life. The last case of death chargeable to the former is reported from Pittsburgh, Pa, on date of April 26, when the following curious collapse took place: Early in the evening a young man (afterward identified as Edward Schaum, a resident at First alley and Cedar avenue, Allegheny,) while aimlessly standing on the corner of Liberty and Sixth streets, noticed that a crowd had gathered in front of Griffith & Weis's dry goods store, just close by. Walking toward the somewhat excited gathering Schaum, perceiving the form of a lad lying prostrate on the sidewalk, elbowed his way through the throng, and, to save himself from falling, seized hold of an iron awning post. No sooner had he touched the post than the mere contact sufficed to first whirl him round like a top and then dash him to the ground. The onlookers raised him to his feet; but he was limp and motionless, and the doctors, who were immediately summoned, pronounced Schaum to be a corpse. The electric street lights on that particular circuit had been acting in a most eccentric manner; and it appears that, owing to a rupture of the insulating material on one of the lighting conductors, a naked electric light wire made contact with the iron awning posts in front of Griffith & Weis's shop, and thus formed a perfect death trap—Schaum being the first one to suffer fatally from its existence. The evening had been damp and rainy, so none of the fatal conditions were lacking. This is the fifth death from like cause that has been reported within almost an equal number of fortnights; and we would suggest, in consequence of the fact that electric plants put up a year or so ago have deteriorated to such an extent as to cause their insulating material to be in a strained or rotten condition, that the matter of underground wire placing should be made com-

pulsory without further extension of time being granted. It is not so long ago (but long enough in all conscience) when we were assured that overhead wires in New York city would speedily be a thing of the past; nevertheless the commission then appointed has now to acknowledge and mourn over the demise of one of its members, while the wires still stretch out from "pole to pole." Indeed, presuming upon the length of life usually attributed to the average of mankind, it may be borne out by the future recorder of events that the obituaries of all three of the original commissioners were enshrined on the mortuary scrolls ere the business for which they were appointed was accomplished.

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Cheaper Gas for Nashville, Tenn.—Mr. Samuel Prichitt, President of the Nashville (Tenn.) Gas Light Company, has made up his mind that Nashville must have cheap gas, since he proposes, from and after first day of June, to adjust the figures to the following schedule: Gross price to be fixed at $2.10 per thousand, and promt payment—within five days of presentation of bill—to entitle the customer to a rebate of ten per cent. This, of course, makes a net rate of $1.89 per thousand. The contract with the city, in the matter of gas supplied to public lamps, etc., remains as before—a net rate of $1.05 per thousand. Mr. Prichitt further offers to make one uniform rate to city and consumers, if the Council will so agree, of a gross charge of $2 per thousand, with 25 cents off for prompt payment, or a net rate to both of $1.75. Under the original or first proposition, as computed from the accounts of the company, the latter would receive an average of $1.77 cents per thousand for gas supplied to both classes of consumers; while, if the Council accepted the last or second suggestion, all hands would be taxed but $1.75 per thousand. There can be no doubt, however, that the first arrangement would, as a rule, approximate to the councilmanic idea of such matters; since these will "point with pride," on next election day, to the fairness (?) of their action in unduly taxing those who have the temerity or hardihood to use gas in their houses—in order that those who do not so use it may have its benefit when burned in the street lamps. Messrs. Prichitt and Kendrick (the latter is the Nashville company's go-ahead Secretary) are on the right road, in any event. Keep down the prices, both to city and consumer.

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Cheaper Gas for Wilkes-Barre Pa.—Mr. Marcus Smith, Secretary of the Wilkes-Barre Gas Company, has notified us that from and after first day of present month the following selling rates became operative: Gross price was placed at $1.80 per thousand, and payment within 15 days from date of presentation of bill entitled consumers to receive a discount graded in proportion to the quantity of gas used in the 30 days. The percentages on quantities rate as follows: Bills under $20, 5 per cent. off; over $20, but less than $50, 10 per cent. off; over $50, 20 per cent. off. Mr. Smith intends to follow the suggestion, thrown out most recently by President Greenough, in his address before the last meeting of the New England Association, to keep with the band of the procession rather than to struggle along with the baggage. There may be a trifle more labor involved in the practice, but what matters that when the additional glory (and dollars) is remembered. Cheap gas means success; and all the doubters thereon are respectfully referred to the judgment of Messrs. Harbison and Cushing. They can "speak by the profits," and the no less important fact that opposition tacticians fail to fancy the Hartford and Lowell districts.

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If There is Natural Gas There.—The Indianapolis (Ind.) Gas Light Company has determined upon making an exhaustive inquiry into the matter of the likelihood of finding out whether natural gas exists in that locality in paying quantities; and in furtherance of said object are now engaged in sinking a test well on South street. The contractors have been instructed to drive the bore hole to a depth of 2,500 feet, and it is estimated the work will absorb between five and six thousand dollars. It might be added, Prof. Collett, who is thoroughly posted on the geology of the strata underlying Indianapolis, predicts the scheme will result in failure.

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Electric Lighting at Poughkeepsie, N. Y.—It is said that the Poughkeepsie Common Council has awarded a contract to the Poughkeepsie Electric Light Company under the terms of which the latter agrees to light those portions of the city formerly lighted by gas, for the sum of $18,000 per annum. Perhaps Mr. Allen would favor us with some particulars as to this astounding change of base on the part of the Poughkeepsie authorities.

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Cheaper Gas for East Saginaw, Mich.—Mr. G. A. Hyde, Jr., Supt. to the East Saginaw Gas Light Company, writes us that the directors have determined upon supplying cheap and good artificial light to the inhabitants of the great salt producing center of the West. The new gross figure is placed at $2 per thousand; and prompt payment (15 days are allowed therefor) secures a rebate of 25 cents per thousand on all quantities employed for illuminating purposes. This discount is enlarged to sixty cents per thousand on gas quantities taken up for use in cooking and heating stoves, and also in all mechanical purposes. The latter description of consumption, we presume, must be registered on separate meters. The company has opened up a gas stove display wareroom, and every effort will be made to largely increase day output for domestic application. Mr. Hyde predicts entire success will crown the attempt, and we must agree with him, for the item of cheap gas may be trusted to "boom" matters. Some of the other Michigan companies might do well in following out the East Saginaw system.

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Well Done.—As intimated in our financial note in last issue, the Committee of Manufactures of the Massachusetts State Legislature reported "leave to withdraw" to those who petitioned for a change in the Massachusetts law which restricts merchantable gas to a content of not over 10 per cent. of carbonic oxide. It is understood that two reports were presented by Committee—the vote was 7 against change to 4 in favor—and it is expected that these will be finally disposed of by the Legislature before end of present week—the one ending May 15. Well-informed people predict that the Legislature will sustain the majority. The remonstrants are to be congratulated; and they well deserve success, for their side of the case was handled with splendid ability and force. Massachusetts legislators are not as fond of playing fast and loose as some of their law-making brethren in other States appear to be.

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Edgewater (S. I.) Public Lights.—The trustees of the town of Edgewater entered into a contract with the Richmond County (Staten Island) Gas Company, on date of April 30, under which the latter will supply the former with gas to street lanterns at a charge of $18 per post per annum. The contract is to run twelve months from 1st inst.

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Beaten by the North Adams (Mass.) Gas Man.—Frank Richardson, of the North Adams Gas Light Company, informs us that electricity got a black eye in his place last week. Particulars in our next.

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Progress of the Wellington (Kan.) Gas Plant.—The holder tank for the new plant at Wellington is completed and ready for the iron work. The retort house and purifying structure—its dimension is 45 by 72 feet—is well under way.

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Annual Report Received.—We are in receipt of Annual Report of Superintendent (Mr. Jno. H. Knowles) of the City Gas Works, Richmond, Va. The details cover working operations for year ended, December 31st, 1885, and these will be analyzed later on.

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## Correspondence

[The Journal is not responsible for the opinions expressed by correspondents.]

### Gas Engines as Exhauster Motors.

Gas Company's Office,
Launceston, Tasmania, Mar. 26, 1886.

To the Editor American Gas Light Journal:

In your issue of Feb. 2, 1886 (just to hand), I notice that, at a meeting of the American Gas Light Association one of the questions asked was, "Can the gas engine be successfully used to drive an exhauster?" To that Mr. Helme is reported to have said, "* * but I never knew of one that would permit of an even pressure in the hydraulic main."

Now, Mr. Helme has, it seems to me, tried to regulate the speed of the gas engine in the same manner that he would attempt to control a steam engine, and found it to fail; and I am not surprised at his non-success. There is an apparatus successfully employed for driving exhausters (gas engine being the prime mover), which, by automatically shifting the belt over straight-coned pulleys, alters the speed of the exhauster to suit the make of gas, and so maintains, with great regularity, a uniform suction on the hydraulic main. The apparatus is Fison's patent, and is manufactured by Snowdon, of Leeds, England.

I do not use a gas engine, because steam is handier for many purposes—such as driving a tar pump, steaming condensers, and many other purposes in a works. My apparatus here will be two exhausters, coupled with the blades at right angles, and driven from counter-shafting at 63, 100, and 158 revolutions per minute. The difference of make will be bye-passed by an automatic governor of simple construction. This same system might suit Mr. Helme. It has the merit of simplicity, and, besides, the counter-shaft is used to drive other machines.

I also notice that some of the engineers in attendance at the meeting spoke of their exhausters clogging up with tar, etc. I have experienced the same trouble, and have used mineral oil during the periods until repeated stoppages suggested the use of castor oil, with a little kerosene added; and since then the exhauster could be turned with one hand. Apologizing for troubling you, I remain,

Yours faithfully,

T. S. Cleminshaw, Engineer.

## The Market for Gas Securities.

Consolidated stock was treated on the street, during the past fortnight, very much after the fashion pursued by the "small boy" who indu'ges in a game of football. The lowest price recorded was 89, and the highest 96. To-day (May 13th) the shares opened at 91½, and despite the knowledge that Gov. Hill (yesterday) signed the bill which pretends to reduce gas prices in New York city to $1.25 per thousand, and also the Thomas, or Gas Consumers Association's pet project (he vetoed the Commission measure) quotations advanced to 93½, but subsequently reacted to 91¾. Of course, the arbitrary attempt at fixing gas prices in this city will be passed upon by the courts, and in all likelihood an injunction will be issued to prevent the enforcement of the measure until such time as the highest judicial authority in the country has passed upon its validity. Careful analysis of the Supreme Court decisions in the matter of the Louisville and New Orleans gas cases, joined to an examination of the general laws of the State of New York, under which a majority of the gas companies of the State have been organized, leads to the conclusion that the Reilly act will fail of its purpose.

The State, unless it confers special powers upon a company in the provisions of a charter, extends to a gas manufacturing company no valuable concession of privilege in which the residents of the State, as a whole, are concerned. Possibly the the residents of a district in which the corporation is to operate may specify the terms under which the streets may be opened; and these terms might be sufficiently elastic to cover the regulation of prices, as well as other items.

All city and Brooklyn gas shares have suffered a shrinkage in values; and in connection with Assemblyman Hotchkiss' bill to regulate gas prices in the City of Churches it might, in passing, be remarked that Hotchkiss does not even live in Kings County, but hails Flushing, L. I., as his resting place. Old Memphis (Tenn.) gas shares are quoted at 78 to 80. Consolidated, of Baltimore, is at 48¼. The Massachusetts Legislature has refused to change the carbonic oxide regulations.

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